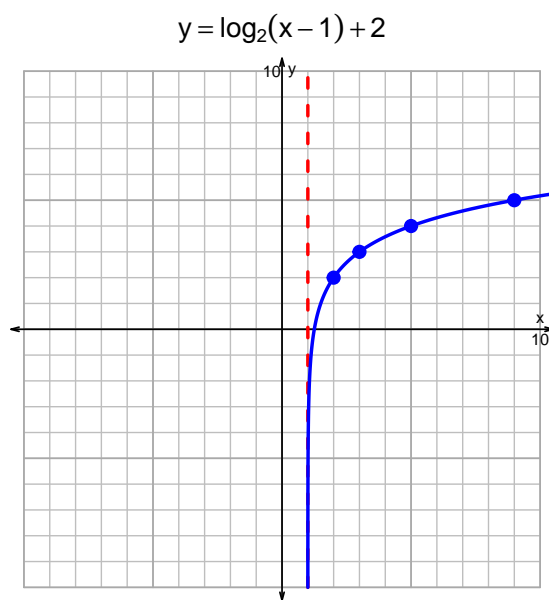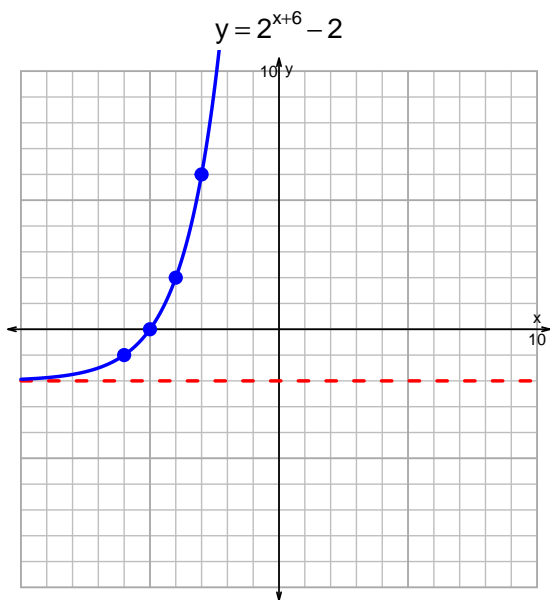## s18: EXP LOG (SLTN v321)

1. (10 pts) Graph $y = 2^{x+6} - 2$ and $y = \log_2(x - 1) + 2$ on the grids below. Also, draw any asymptotes with dashed lines.

$y = 2^{x+6} - 2$

$y = \log_2(x - 1) + 2$

Somewhat useful hint: $2^3 = 8$, *and thus* $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$11 = \left(\frac{5}{3}\right) \cdot 2^{-7t/4}$$

Divide both sides by $\frac{5}{3}$.

$$\frac{11 \cdot 3}{5} = 2^{-7t/4}$$

Take log, base 2, of both sides.

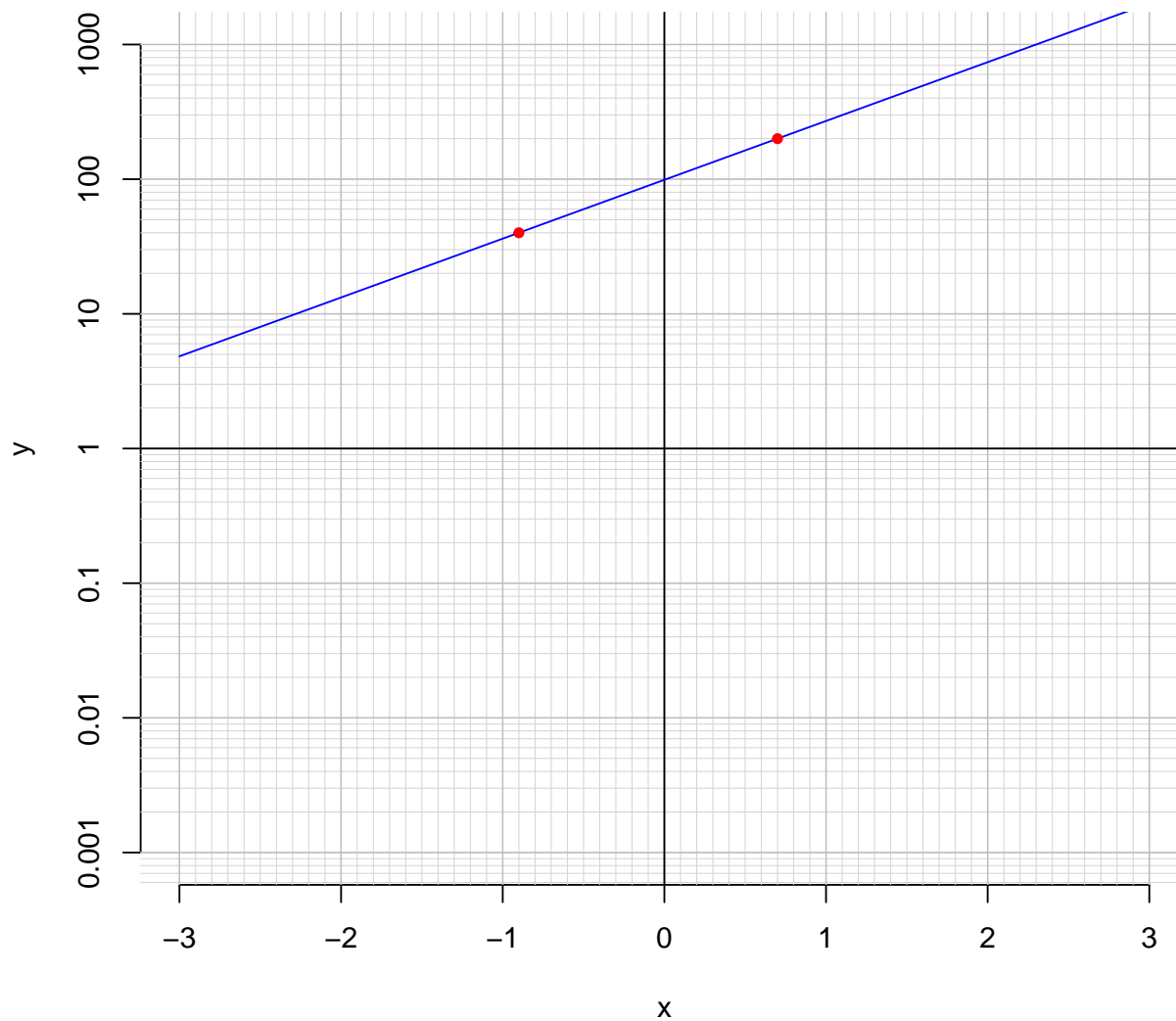$$\log_2\left(\frac{11 \cdot 3}{5}\right) = \frac{-7t}{4}$$

Divide both sides by $\frac{-7}{4}$.

$$\frac{-4}{7} \cdot \log_2\left(\frac{11 \cdot 3}{5}\right) = t$$

Switch sides.

$$t = \frac{-4}{7} \cdot \log_2\left(\frac{11 \cdot 3}{5}\right)$$

3. (10 pts) An exponential function $f(x) = 98.9 \cdot e^{1.01x}$ is graphed below on a semi-log plot.

a. Using the plot above, evaluate $f(0.7)$.

$$f(0.7) = 200$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{1}{1.01} \cdot \ln\left(\frac{x}{98.9}\right)$$

Using the plot above, evaluate $f^{-1}(40)$.

$$f^{-1}(40) = -0.9$$